Upgrade Your Infrastructure – Network

Wireless Access Security at the Network Edge

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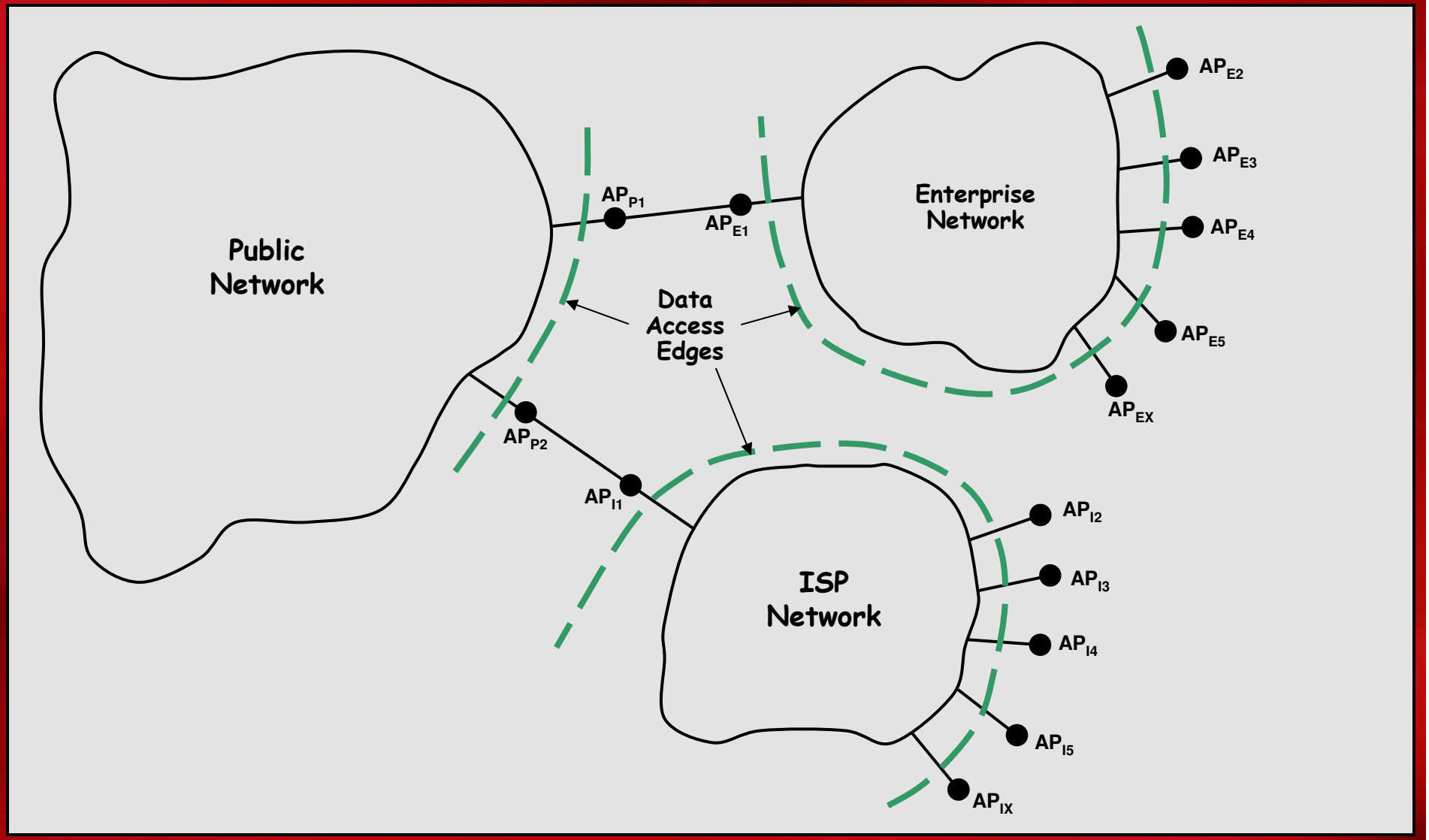
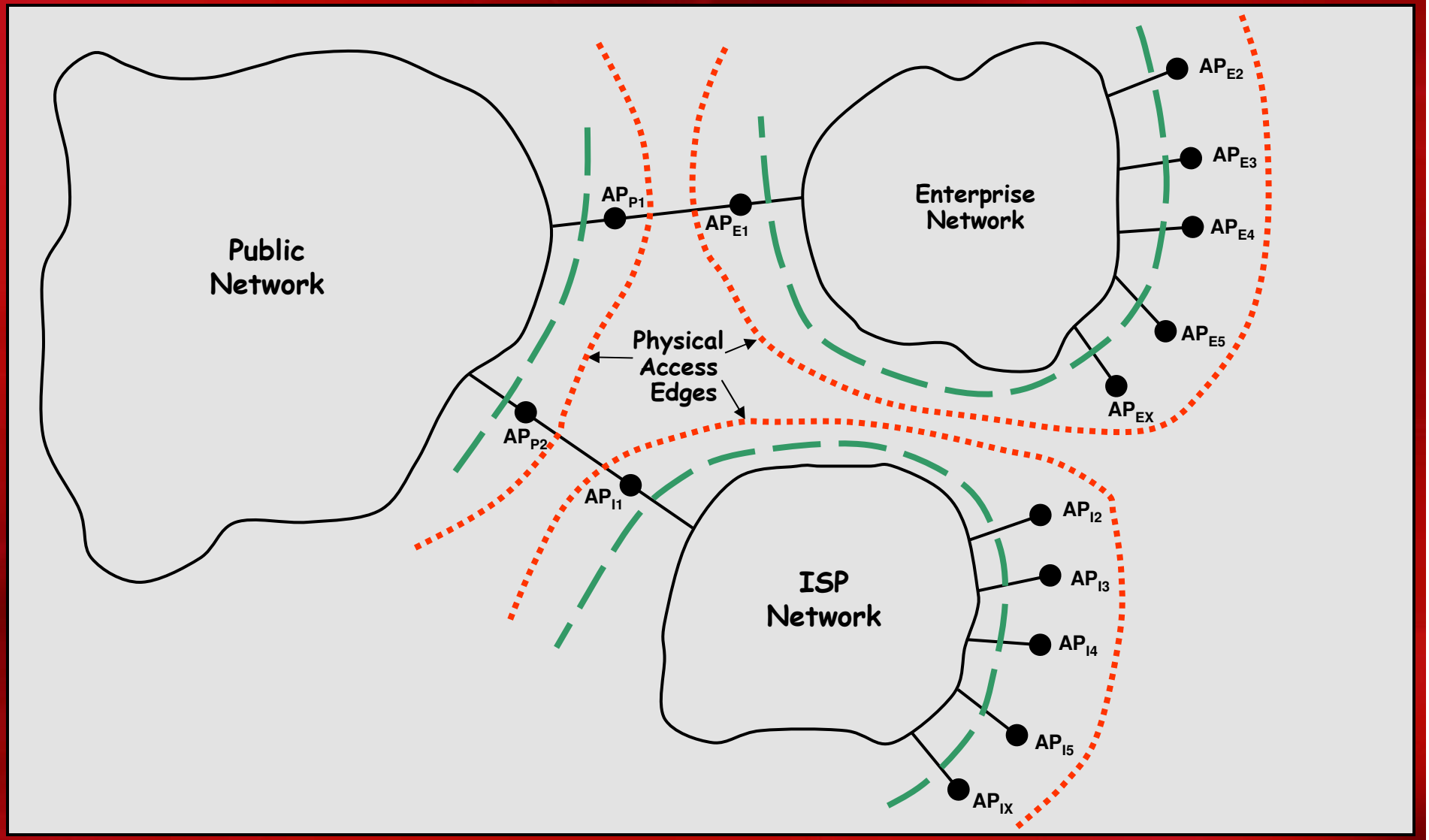
Session Overview

Integrating wired and wireless networks requires a firm grasp of the advantages and disadvantages presented by both network topologies. When done correctly, the integration process extends to the wireless LAN the same levels of security, scalability, and reliability typically associated with traditional wired networks. Find out how top IT organizations are expanding and enhancing their wireless infrastructure, including specifics for configuring and optimizing access points, client devices, switches and routers.

Traditional Wired-Network Data-Access Edges

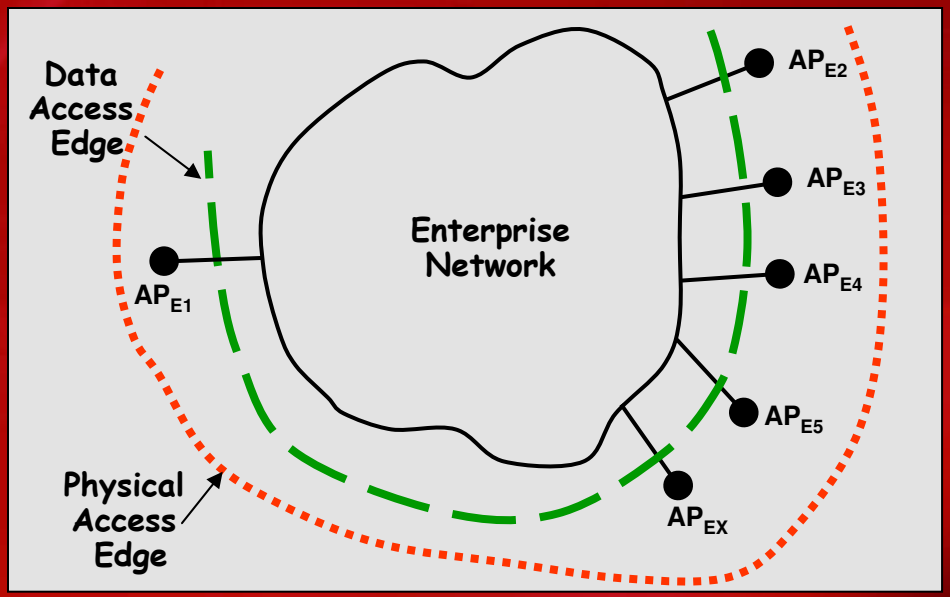


Traditional Wired-Network Physical-Access Edges



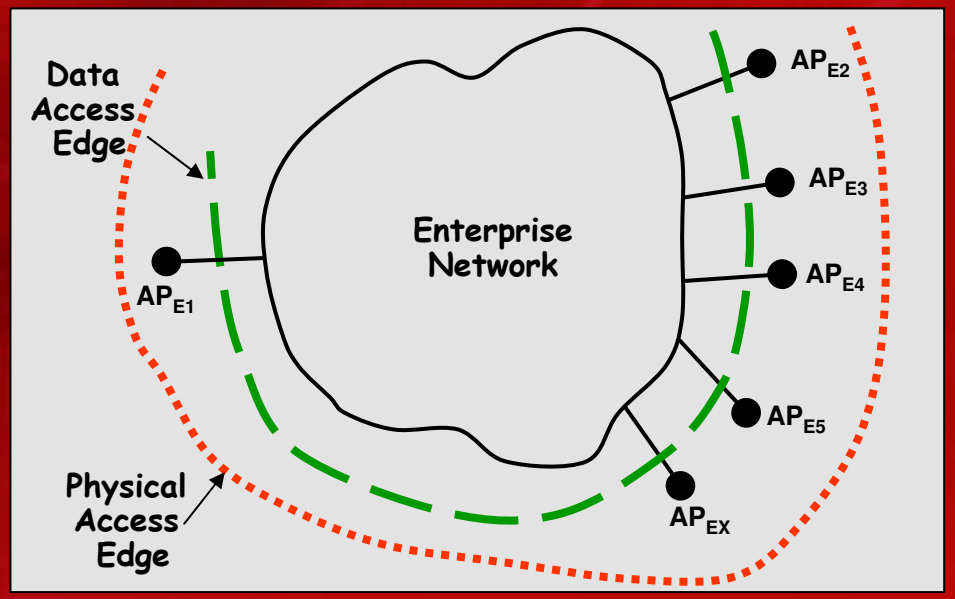
Good Internal Security Measures

- AP_{E1} Access Management
  - **Firewall/NAT**
- Internal Network Security Management
  - **"need to know" firewalls and NAT partitioning**
- AP_{EX} Access Management
  - **Limited physical access**
  - **User authentication**



Traditional Access Security/Privacy Measures

- Physical Access Management
- Switches – not hubs
- IP Management
- MAC Authorization
- User Authorization
- Virtual Private Network



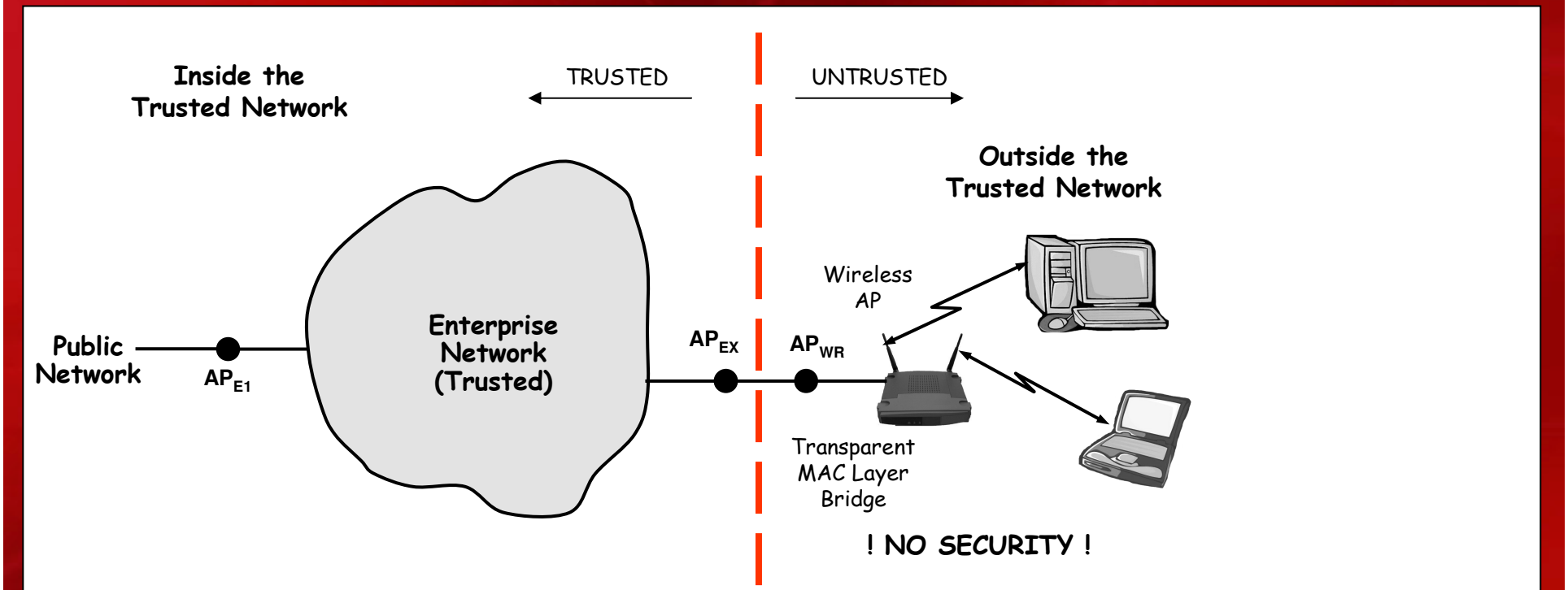
WLAN Connection Choices

- Rogue Access Point
- Mobile/Portable Ad Hoc WLANs
- Bridges
  - **Point to point**
  - **Point to multipoint**
- Repeaters
- Infrastructure Connected WLANs – Inside the trusted network
- Infrastructure Connected WLANs – Outside the trusted network

The Ubiquitous Wireless Access Point

- Install "out of the box"
  - **Rogue access point**
  - **Transparent MAC-Layer Bridge**
  - **No security**
  - **Not a good choice!**

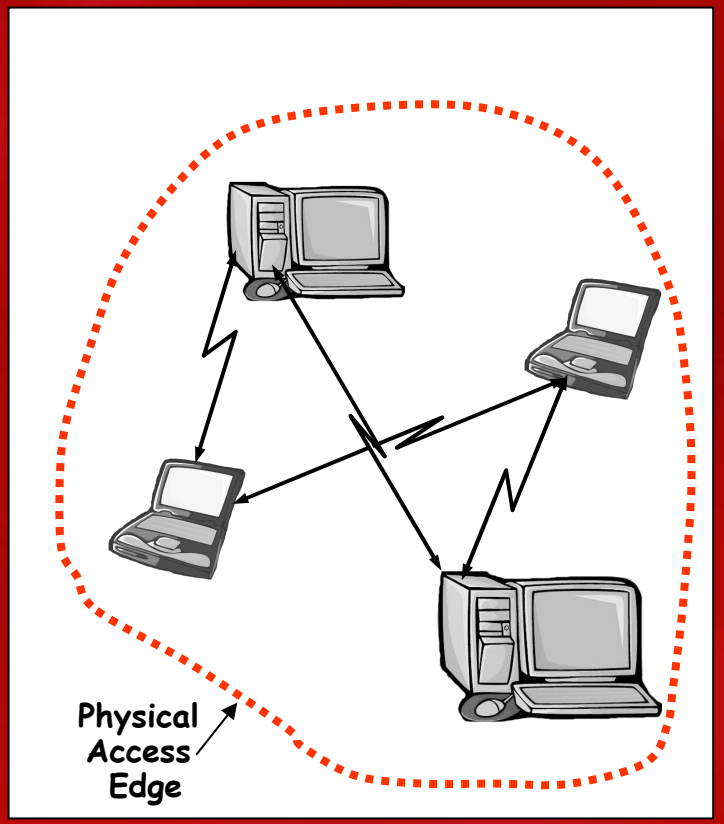
Rogue Access Point



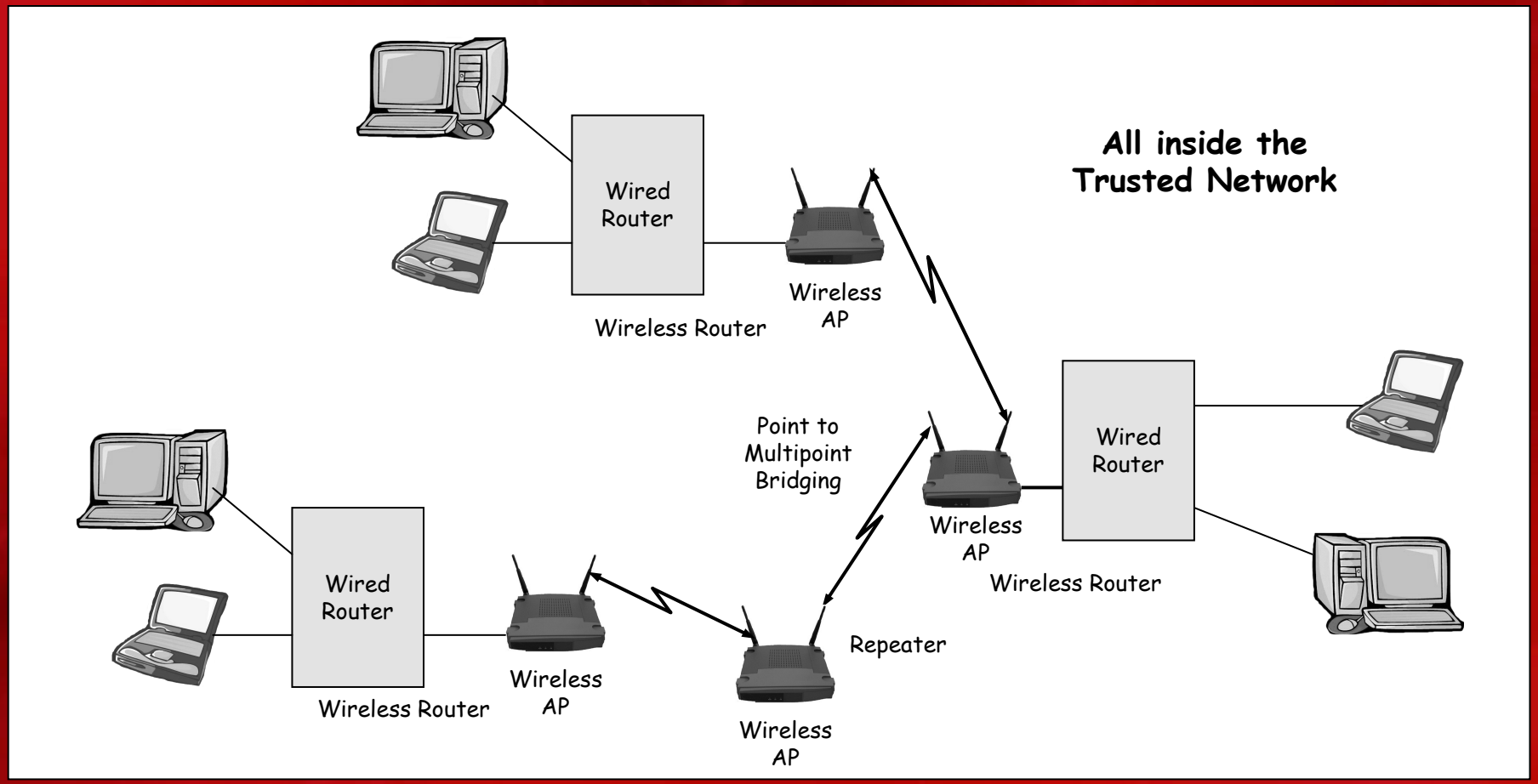
Connects an Untrusted Network to a Trusted Network

Mobile/Portable Ad Hoc WLANs

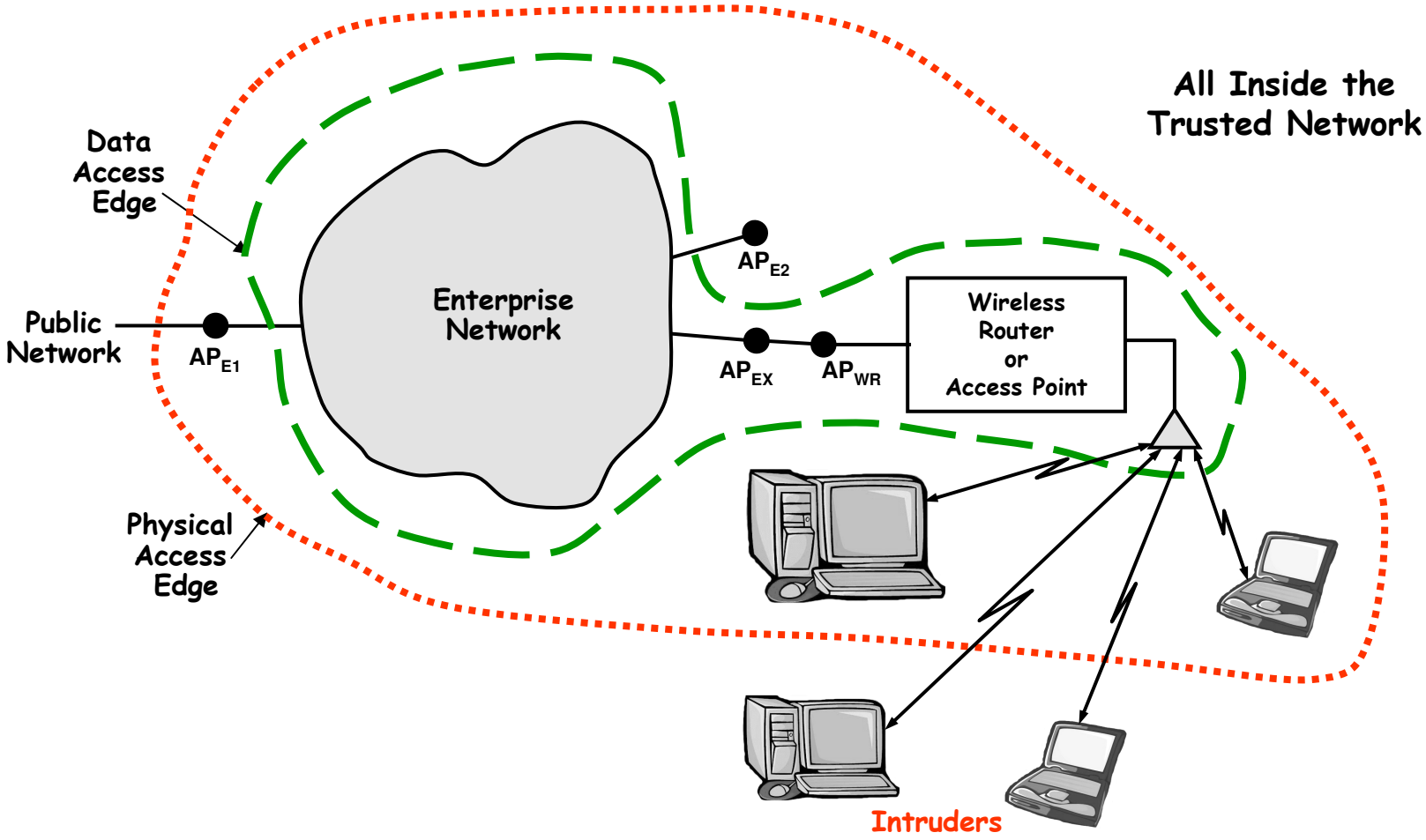
- NIC to NIC wireless link
- NIC-level security
- User maintained security
- "Hot" research area
  - **Mobile Ad Hoc Networks (MANETs)**



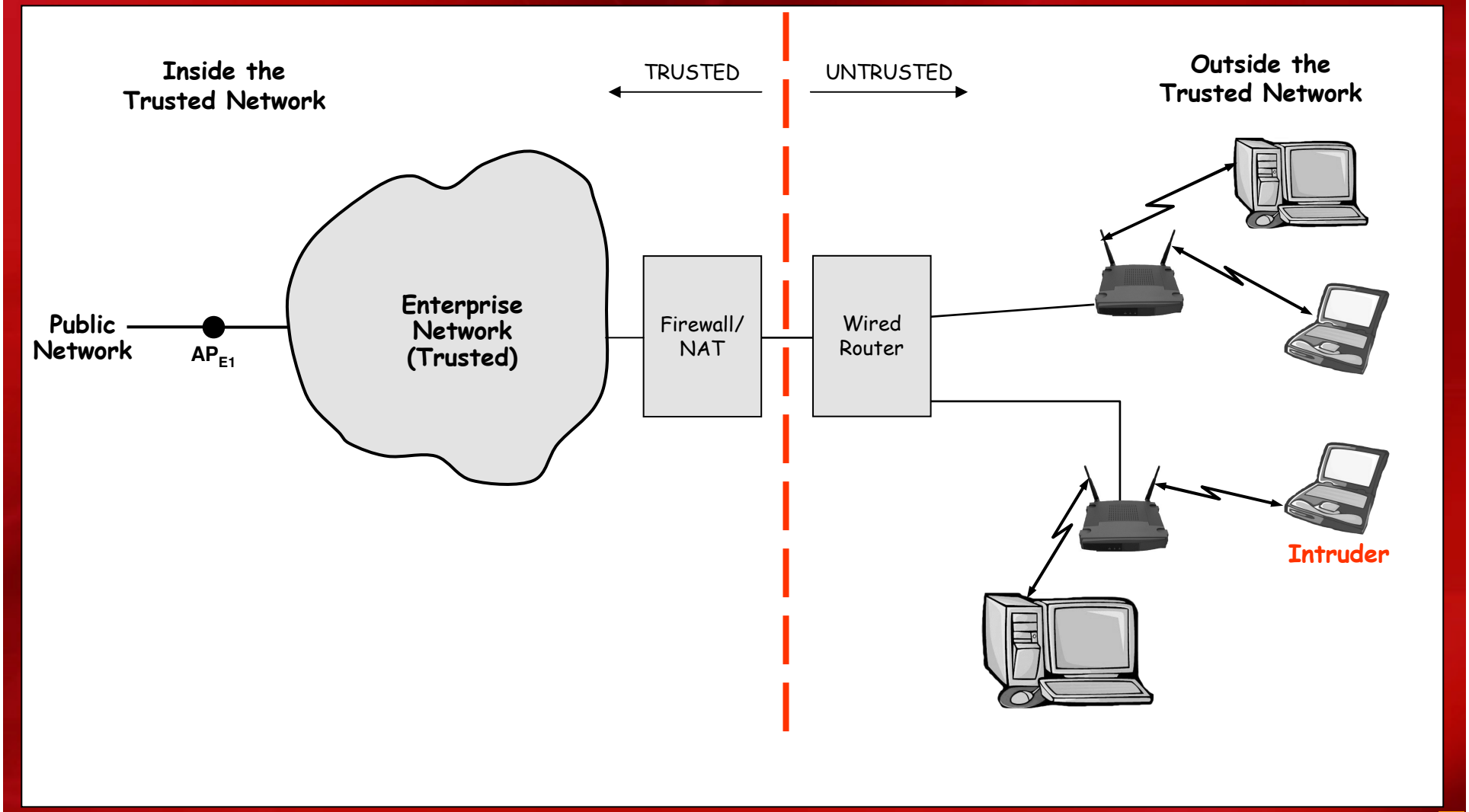
Wireless Bridges and Repeaters



Infrastructure Connected WLANs
Inside the trusted network



Infrastructure Connected WLANs
Outside the trusted network



WLAN Security Issues – Airlink Security (Wireless Access Point Security)

- **Airlink intrusion Security**
  - Wired equivalent privacy
  - WiFi Protected Access
  - RADIUS: Authentication, authorization, and access control
  - Two-way (Mutual) Authentication
- **Airlink eavesdropping Security**
  - Wired equivalent privacy
  - WiFi Protected Access
- **Airlink denial of access (DOA) Security**
  - Anti-interference, anti-jam
- **Rogue Access point**
  - Rogue AP detection

WLAN Security Issues – System Security

- **User authorization**
  - Username-Password
- **User identification**
  - IP
  - MAC
  - Electronic Fingerprint
- **User Privacy**
  - Virtual Private Network (VPN)

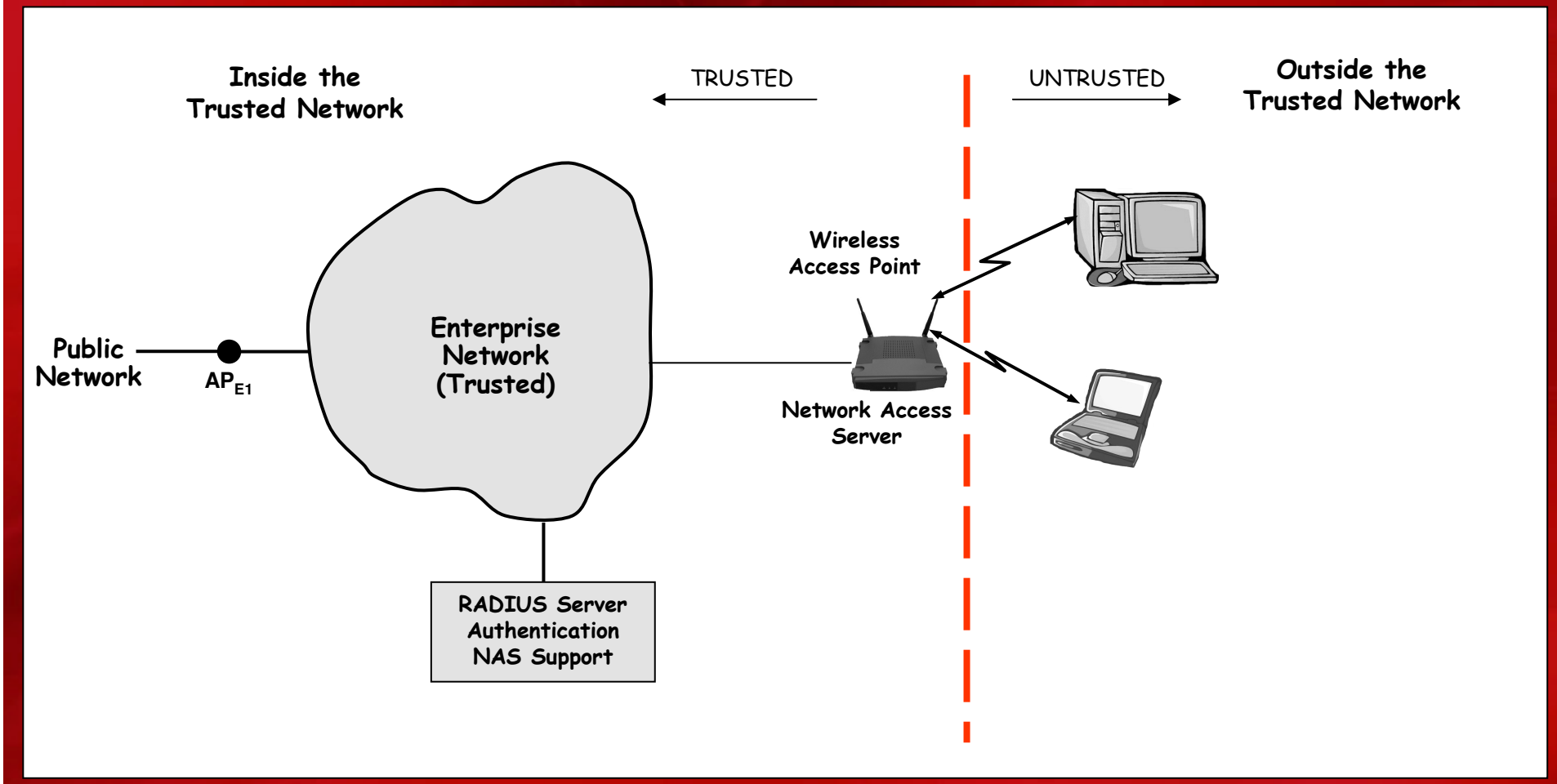
Wireless Security Technologies and Policies

- Physically secure access points (reasonably)
- Turn off SSID broadcasting
- Avoid default SSID names
- Enable WEP or WPA or IEEE 802.11i
- Enable dynamic key exchange (if available)
- Enable user authentication
  - **RADIUS authentication**
  - **Username, password, certificates, etc**
- Enable rogue access point detection
  - **Use wireless sniffing**
  - **Port 80 scanning**
- Use only static IP for all devices

Wireless Security Technologies and Policies (cont)

- Use firewalls where ever possible
- Use Virtual private networks
- Use two-way (mutual) authentication
- WEP – Wired Equivalent Privacy
  - **Use automatic WEP key rotation**
- WPA – WiFi Protected Access
  - **Temporal Key Integrity Protocol**
  - **Message integrity check**
  - **Extended initialization vector**
  - **Pre-Shared Key for home and small office**

Wi-Fi Protected Access (WAP) with RADIUS Server



Future Wireless Security Technologies

- Electronic Fingerprinting of wireless NICs and access points
- Position Location of intruder NICs and rogue access points
- Wireless Honeynets
- Jamming of wireless intruders
- Wireless coverage area management with high-gain antennas

?QUESTIONS?

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ACRONYMS

- AAA - Authentication, Authorization, Accounting
- ACL - Access Control List
- AP - Access port (network)
- EAP - Extensible Authentication Protocol (IEEE 802.11i). Wireless LAN security protocol that uses RADIUS -
- MAC - Medium Access Control
- MIC - Message Integrity Check
- NAS - Network Access Server
- PAP - Password Authentication Protocol
- PSK - Pre-Shared Key (WPA for home or small office - master key)
- RADIUS - Remote Authentication Dial In User Services (IETF standard RFC 2058)

ACRONYMS (cont)

- SSID - Service Set Identifier (for wireless LAN)
- TKIP - Temporal Key Integrity Protocol (Wi-Fi Protected Access)
- VPN - Virtual Private Network
- WLAN - Wireless Local Area Network
- WPA - Wi-Fi Protected Access (a subset of IEEE 802.11i)